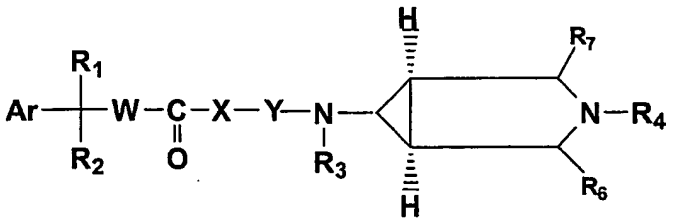
We claim:

1. Compounds having the structure of Formula I:



Formula I

and their pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, or metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C_1-C_4), lower perhaloalkyl (C_1-C_4), cyano, hydroxy, nitro, halogen (e.g. F, Cl, Br, I), lower alkoxy (C_1-C_4), lower perhalo- alkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4) or N-lower alkylamino carbonyl (C_1-C_4);

R_1 represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy , carbamoyl or halogen (e.g. fluorine, chlorine, bromine and iodine);

R_2 represents alkyl, C_3-C_7 cycloalkyl ring in which any 1-4 hydrogen atoms are substituted with halogen (e.g. F, Cl, Br, I), carbamoyl or lower alkyl;

W represents $(CH_2)_p$, where p represents 0 to 1;

X represents an oxygen, sulphur, NR or no atom wherein R represents hydrogen or C_1-C_6 alkyl;

Y represents CHR_5CO wherein R_5 represents hydrogen, methyl or $(CH_2)q$ wherein q represents 0 to 4;

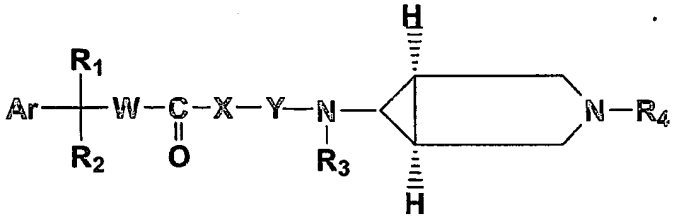
R_3 represents hydrogen, lower alkyl or $CO_2C(CH_3)_3$;

R_6 and R_7 are independently selected from H, lower alkyl, COOH, $CONH_2$, NH_2, CH_2NH_2; and

R_4 represents C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon (straight chain or branched) in which any 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on an aryl or heteroaryl ring in said arylalkyl, arylalkenyl, heteroarylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxy, nitro, lower alkoxycarbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), or N-lower alkylamino carbonyl (C_1-C_4).

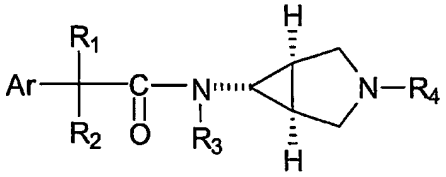
2. A compound according to claim 1 having the structure of Formula II and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar, R_1, R_2, W, X, Y, R_3 and R_4 are as defined for formula I.



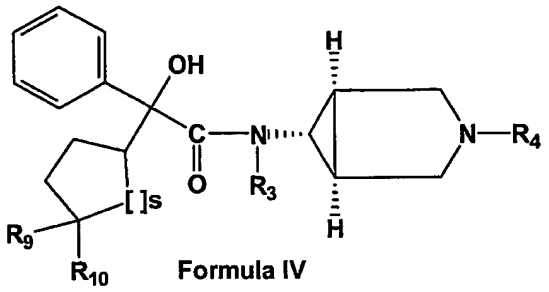
Formula II

3. A compound according to claim 1 having the structure of Formula III and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein Ar, R_1, R_2, R_3 and R_4 are as defined for Formula I.



Formula III

4. A compound according to claim 1 having the structure of Formula IV and its pharmaceutically acceptable salts, esters, enantiomers, diastereomers, N-oxides, prodrugs, or metabolites wherein R_3 and R_4 are as defined for Formula I, and s represents 1 to 2, R_9 is H or F and R_{10} is F.



Formula IV

5. A compound selected from the group consisting of

(2S)-(1∝, 5∝, 6∝)-6-N-[3-benzyl-3- azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3-oxocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1∝, 5∝, 6∝)-6-N-[3-benzyl-3-azabicyclo[3.1.0]-hexyl]-2[(1R or 1S, 3R or 3S)-3-(fluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-benzyl-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-benzyl-3-azabicyclo[3.1.0]-hexyl]-2-2[(1R or 1S)-3, 3-difluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-benzyl-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3,3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2R)-(1α, 5α, 6α)-6-N-[3-benzyl-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3,3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2S)- (1α, 5α, 6α)-6-N-[3-(2-(3,4-methylenedioxyphenyl)ethyl]-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(2-(3, 4-methylenedioxyphenyl)ethyl]-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2R)-(1α, 5α, 6α)-6-N-[3-(2-(3,4-methylenedioxyphenyl)ethyl]-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(2-(3, 4-methylenedioxyphenyl)ethyl]-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(2-(3, 4-methylenedioxyphenyl)ethyl]-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(4-methyl-3-pentenyl)-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(4-methyl-3-pentenyl)-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

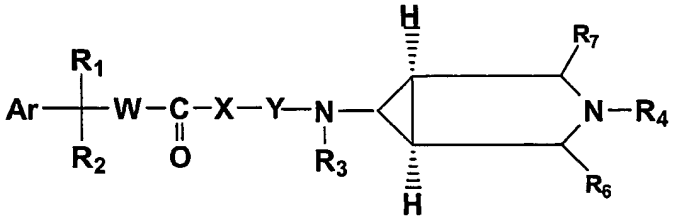
(2R)-(1α, 5α, 6α)-6-N-[3-(4-methyl-3-pentenyl)-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S)-3, 3-difluorocyclopentyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(4-methyl-3-pentenyl)-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclohexyl]-2-hydroxy-2-phenylacetamide

(2S)-(1α, 5α, 6α)-6-N-[3-(4-methyl-3-pentenyl)-3-azabicyclo[3.1.0]-hexyl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclopentyl]-2-hydroxy-2-phenylacetamide.

6. A pharmaceutical composition comprising a therapeutically effective amount of a compound as defined in any of claims 1-5 together with pharmaceutically acceptable carriers, excipients or diluents.

7. A method for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula I,



Formula I

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C_1-C_4), lower perhaloalkyl (C_1-C_4), cyano, hydroxy, nitro, halogen (e.g. F, Cl, Br, I), lower alkoxy (C_1-C_4), lower perhalo- alkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4) or N-lower alkylamino carbonyl (C_1-C_4);

R_1 represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy , carbamoyl or halogen (e.g. fluorine, chlorine, bromine and iodine);

R_2 represents alkyl, C_3-C_7 cycloalkyl ring in which any 1-4 hydrogen atoms are substituted with halogen (e.g. F, Cl, Br, I), carbamoyl or lower alkyl;

W represents $(CH_2)_p$, where p represents 0 to 1;

X represents an oxygen, sulphur, NR or no atom wherein R represents hydrogen or C_1-C_6 alkyl;

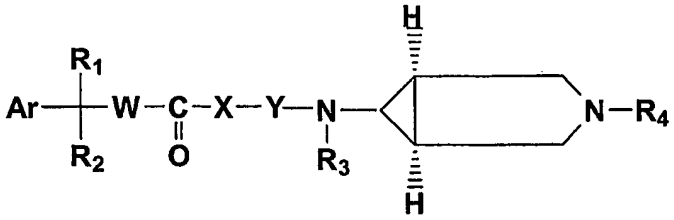
Y represents CHR_5CO wherein R_5 represents hydrogen, methyl or $(CH_2)q$ wherein q represents 0 to 4;

R_3 represents hydrogen, lower alkyl or $CO_2C(CH_3)_3$;

R_6 and R_7 are independently selected from H, lower alkyl, COOH, $CONH_2$, NH_2, CH_2NH_2; and

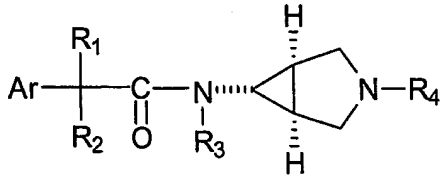
R_4 represents C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon (straight chain or branched) in which any 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on an aryl or heteroaryl ring in said arylalkyl, arylalkenyl, heteroarylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxy, nitro, lower alkoxycarbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4).

8. The method according to claim 7 for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula II and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein Ar, R_1, R_2, W, X, Y, R_3 and R_4 are as defined for Formula I.



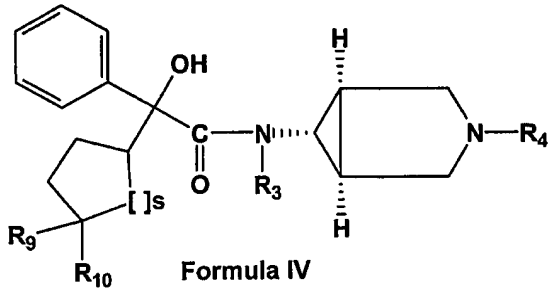
Formula II

9. The method according to claim 7 for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula III and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein Ar, R_1, R_2, R_3 and R_4 are as defined for Formula I.



Formula - III

10. The method according to claim 7 for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula-IV and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein R_3 and R_4 are as defined for Formula I, s represents 1 to 2, R_9=H or F, and R_{10}=F.



Formula IV

11. The method according to claim 7 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic

obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.

12. The method according to claim 8 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestina hyperkinesis.

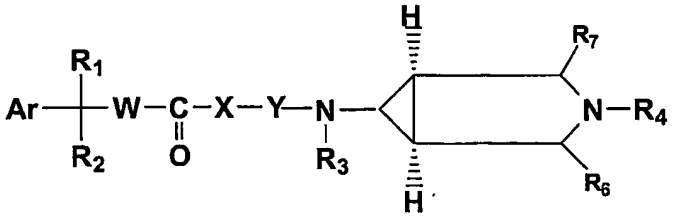
13. The method of claim 9 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestina hyperkinesis.

14. The method of claim 10 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestina hyperkinesis.

15. The method for treatment or prophylaxis of an animal or a human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of the pharmaceutical composition according to claim 6.

16. The method according to claim 15 wherein the disease of disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestina hyperkinesis.

17. A process of preparing compounds of Formula I,



Formula I

and their pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C_1-C_4), lower perhaloalkyl (C_1-C_4), cyano, hydroxy, nitro, halogen (e.g. F, Cl, Br, I), lower alkoxy (C_1-C_4), lower perhalo- alkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4) or N-lower alkylamino carbonyl (C_1-C_4);

R_1 represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy , carbamoyl or halogen (e.g. fluorine, chlorine, bromine and iodine);

R_2 represents alkyl, C_3-C_7 cycloalkyl ring in which any 1-4 hydrogen atoms are substituted with halogen (e.g. F, Cl, Br, I), carbamoyl or lower alkyl;

W represents $(CH_2)_p$, where p represents 0 to 1;

X represents an oxygen, sulphur, NR or no atom wherein R represents hydrogen or C_1-C_6 alkyl;

Y represents CHR_5CO wherein R_5 represents hydrogen, methyl or $(CH_2)q$ wherein q represents 0 to 4;

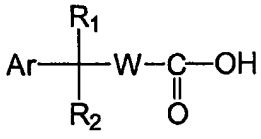
R_3 represents hydrogen, lower alkyl or $CO_2C(CH_3)_3$;

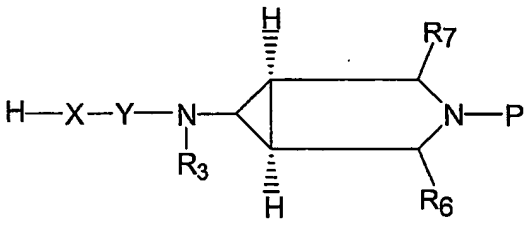
R_6 and R_7 are independently selected from H, lower alkyl, COOH, $CONH_2$, NH_2, CH_2NH_2; and

R_4 represents C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon (straight chain or branched) in which any 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on an aryl or heteroaryl ring in said arylalkyl, arylalkenyl, heteroarylalkenyl

group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxy, nitro, lower alkoxycarbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4), comprising

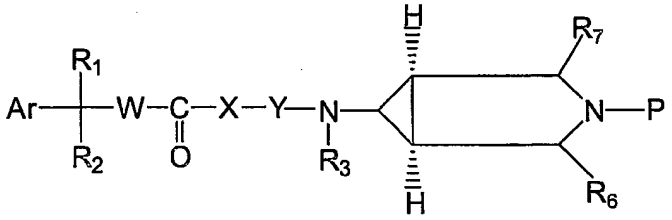
(a) condensing a compound of Formula VI with a compound of Formula V





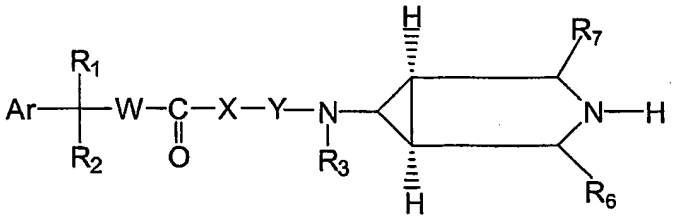
Formula VI **Formula V**

wherein Ar, R_1, R_2, W, X, Y, R_3, R_6 and R_7 are as defined earlier for Formula I, to give a protected compound of Formula VII wherein Ar, R_1, R_2, W, X, Y, R_3, R_6 and R_7 are as defined earlier and P is a protecting group for an amino group,



Formula VII

(b) deprotecting the compound of Formula VII in the presence of a deprotecting agent to give an unprotected compound of Formula VIII wherein Ar, R_1, R_2, R_3, W, X, Y, R_3, R_6 and R_7 are as defined earlier, and



Formula VIII

(c) N-alkylated or benzylated the compound of Formula VIII with a suitable alkylating or benzylating agent to give compounds of Formula I wherein Ar, R_1, R_2, W, X, Y, R_3, R_4, R_6 and R_7 are as defined earlier.

18. The process according to claim 17 wherein P is selected from the group consisting of benzyl and t-butyloxy carbonyl groups.

19. The process according to claim 17 wherein the reaction of a compound of formula V with a compound of Formula VI to give compounds of Formula VII is carried out in the presence of a condensing agent selected from the group consisting of 1-(3-dimethyl amino propyl)-3-ethyl carbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0] undec-7-ene 1,8-diazabicyclo [5.4.0] undec-7-ene.

20. The process according to claim 17 wherein the reaction of a compound of Formula V with a compound of Formula VI to give compounds of Formula VII is carried out in a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulfoxide, toluene and xylene.

21. The process according to claim 17 wherein the reaction of a compound of Formula V with a compound of Formula VI is carried out at a temperature ranging from about 0°C to about 140°C.

22. The process according to claim 17 wherein the deprotection of a compound of Formula VII to give compounds of Formula VIII is carried out with a deprotecting agent selected from the group consisting of palladium on carbon, trifluoroacetic acid (TFA) and hydrochloric acid.

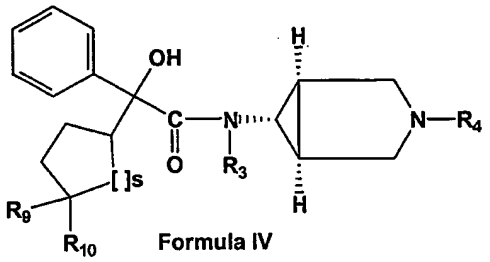
23. The process according to claim 17 wherein the deprotection of a compound of Formula VII to give compounds of Formula VIII is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.

24. The process according to claim 17 wherein the N-alkylation or benzylation of a compound of Formula VIII to give compounds of Formula I is carried out with a suitable alkylating or benzylating agent, L-R_4 wherein L is any leaving group and R_4 is as defined earlier.

25. The process according to claim 24 wherein the leaving group is selected from the group consisting of halogen, O-mestyl and O-tosyl groups.

26. The process according to claim 24 wherein the N-alkylation or benzylation of a compound of Formula VIII to give compounds of Formula I is carried out in a suitable organic solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulfoxide, tetrahydrofuran and acetonitrile.

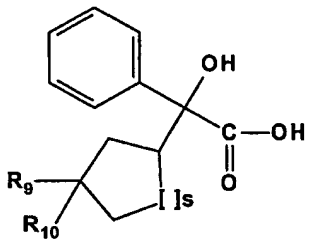
27. A process of preparing compounds of Formula IV,



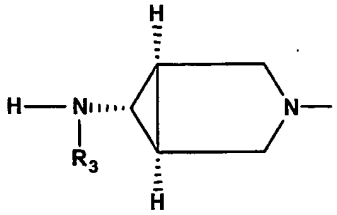
Formula IV

and their pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, or metabolites, wherein R_3 represents hydrogen, lower alkyl or $CO_2C(CH_3)_3$; R_4 represents C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon (straight chain or branched) in which any 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on an aryl or heteroaryl ring in said arylalkyl, arylalkenyl, heteroarylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxy, nitro, lower alkoxycarbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4); s represents 1 to 2, R_9 is H or F and R_{10} is F, comprising

(a) condensing a compound of Formula IX with a compound of Formula X

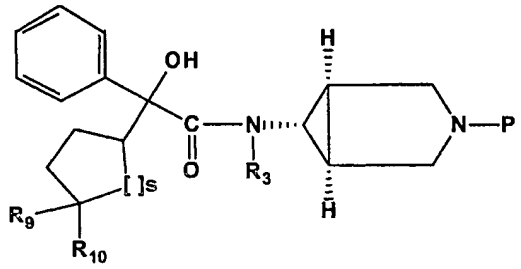


Formula IX



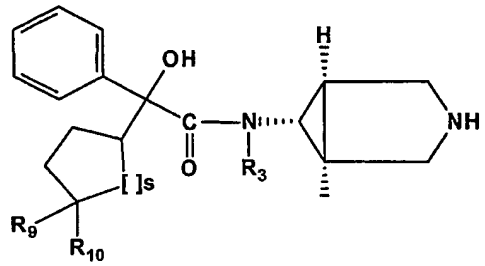
Formula X

wherein R_3 and R_4 are as defined earlier for Formula I, s represents 1 to 2, R_9 is H or F and R_{10} is F, to give a protected compound of Formula XI wherein R_3, R_4, s, R_9 and R_{10} are as defined earlier and P is a protecting group for an amino group,



Formula XI

(b) deprotecting the compound of Formula XI in the presence of a deprotecting agent to give an unprotected compound of Formula XII wherein R_3, R_4, s, R_9 and R_{10} are as defined earlier, and



Formula XII

(c) N-alkylated or benzylated the compound of Formula XII with a suitable alkylating or benzylating agent to give compounds of Formula IV wherein R_3, R_4, s, R_9 and R_{10} are as defined earlier.

28. The process according to claim 27 wherein P is selected from the group consisting of benzyl and t-butyloxy carbonyl groups.

29. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X to give compounds of Formula XI is carried out in the presence of a condensing agent selected from the group consisting of 1-(3-dimethylamino propyl)-3-ethyl carbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0] undec-7-ene (DBU).

30. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X to give compounds of Formula XI is carried out in a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulfoxide, toluene and xylene.

31. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X is carried out at a temperature ranging from about 0°C to about 140°C.

32. The process according to claim 27 wherein the deprotection of compound of Formula XI to give compounds of Formula XII is carried out with a deprotecting agent selected from the group consisting of palladium on carbon, trifluoroacetic acid (TFA) and hydrochloric acid.

33. The process according to claim 27 wherein the deprotection of a compound of Formula XI to give compounds of Formula XII is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.

34. The process according to claim 27 wherein the N-alkylation or benzylation of a compound of Formula XII to give compounds of Formula IV is carried out with a suitable alkylating or benzylating agent, L-R_4 wherein L is any leaving group and R_4 is as defined earlier.

35. The process according to claim 34 wherein the leaving group is selected from the group consisting of halogen, O-mestyl and O-tosyl groups.

36. The process according to claim 34 wherein the N-alkylation or benzylation of a compound of Formula XII to give compounds of Formula IV is carried out in a suitable organic solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulfoxide, tetrahydrofuran and acetonitrile.